

Laboratory Environment Safety and Health Committee

MINUTES OF MEETING 04-08

October 1, 2004

DRAFT – Revision 0

Committee Members Present

D. Beavis^{*}
R. Gill
W. Glenn
W. Gunther
H. Kahnhauser
R. Lee
E. Lessard
R. Travis^{**} (Secretary)

(* ad hoc member, ** non-voting)

Committee Members Absent

N. Bernholc
R. Beuhler
T. Ginsberg
P. Williams

Visitors

M. Ali
R. Casey
N. Gmür
J. Levesque
X. Wang

Agenda:

1. Review of the DUV-FEL Safety Assessment Document and Accelerator Safety Envelope

Minutes of Meeting: Appended on pages 2 through 4.

ESH COMMITTEE MINUTES APPROVED:

E. Lessard

LESHC Chairperson

DH50QR

Chairperson E. Lessard called this meeting of the Laboratory Environmental Safety and Health Committee (LESHC) to order on October 1, 2004 at 10:10 a.m.

1. Review of the Deep Ultra Violet – Free Electron Laser (DUV-FEL) Safety Assessment Document (SAD) and Accelerator Safety Envelope (ASE):

- 1.1. Chairperson E. Lessard invited X. Wang of the National Synchrotron Light Source (NSLS) to present Revision F of the DUV-FEL SAD and Revision B of the ASE. (The presentation, the review material that was transmitted to the Committee and these Minutes are posted on the LESHc website:
http://www.rhichome.bnl.gov/AGS/Accel/SND/laboratory_environemnt_safety_and_health_committee.htm)
- 1.2. Mr. Wang and other members of the made the following points during the course of the presentation and in response to specific Committee questions:
 - 1.2.1. The DUV-FEL at 230 MeV with a 266 nanometer (nm) wavelength is presently the only laser seeded short wavelength FEL in the world. In a July 2003 Chemical Science Workshop, hosted by the NSLS, the user community indicated that 100 nm light would provide new research opportunities in Nanoscience, Nonlinear atomic and surface physics, single molecule detection and other areas.
 - 1.2.2. In order to achieve this capability, the facility is being upgraded to 300MeV with the addition of two new klystrons, for a total of five. The DUV-FEL recently had a vacuum tube failure in an existing klystron. At present, the facility has 4 operable units for a maximum energy of about 270MeV.
 - 1.2.3. In addition to the klystrons, a new linac section, two modulators, and wave guides were installed. The laser interlock system was extended to all areas with laser light and the radiation interlock system was also modified for the new configuration.
 - 1.2.4. There was some discussion concerning whether the new components were listed by an accredited testing laboratory, such as UL. A Laboratory level program is expected to be established in the near future (i.e. approximately six months to address this issue. The Committee noted that this impending program could affect new and existing DUV-FEL electrical equipment.
 - 1.2.5. The shielding was originally designed for 300 MeV. It is unchanged except for some penetrations through local shielding (within the linac) to accommodate the new klystrons.
 - 1.2.6. With the exception of two loss points that assumed 230MeV, all shielding calcs were originally performed for 300MeV and remain valid for this SAD revision. The two loss points (in the linac transport section) have been revised to 300 MeV using the same methodology as the other calculations.
 - 1.2.7. The facility has several methods to control the shielding configuration. In addition to the standard work controls, the shielding has “Do Not Remove” signage and the DUV-FEL operators perform a weekly shielding check.
 - 1.2.8. The shielding ends eight feet above the floor. Access above this height is controlled by training, work controls and signage. For example, Plant

Engineering workers would receive “Safety Orientation” training that stresses the eight-foot limitation. (This is the second level of a three level training program.) In addition, to control roof access, signage is posted on the outside of the building. There haven’t been any violations of this “eight foot rule”.

- 1.2.9. SAD Appendix VI, “Security/Interlock System” is dated 11/06/99. Given the recent facility changes, the Appendix (particularly the Sweep Procedure) appears to require updating. NSLS stated that a new Sweep Procedure has been developed. The Committee noted that instead of reiterating the Sweep Procedure, a simple reference (or electronic link) to the current procedure could be inserted in this Appendix.
 - 1.2.10. The DUV-FEL interlock logic has a 15 second warning duration. Some Committee Members thought that 30 seconds was the Laboratory requirement. NSLS agreed to investigate this concern and confirm that the 15 second duration was acceptable.
 - 1.2.11. The BNL Fire Protection Engineer ([Joe Levesque](#)) has evaluated this facility upgrade, in particular the additional borated polyethylene shielding. Although this shielding is combustible, the existing Fire Hazards Analysis (e.g. the property damage estimate) remains conservative. [The Fire Protection Engineer agreed to document this conclusion in a memo, which will be appended to the FHA \(Appendix 1 of the SAD\).](#)
 - 1.2.12. The Committee observed that the Natural Phenomena Hazards discussion in Section 4.3 of the SAD references DOE orders that may have been rescinded. After some discussion, the LESH Secretary (Rich Travis) volunteered to clarify the DOE Order for Natural Phenomena Hazards that BSA is contractually obligated to comply with – [Complete, see Section 3 below.](#)
 - 1.2.13. At the conclusion of the formal presentation, a section-by-section review of the SAD was conducted. The Committee offered detailed comments on the text. [The NSLS committed to revise the SAD and submit it for Committee review and approval.](#)
 - 1.2.14. With regard to Section 5.2 of the Operating Envelope of the DUV-FEL ASE (Rev. B), there was some discussion about the sentence: “This Maximum Electron Beam Energy is nominally limited by the installed capability of power systems.” The concern was that “nominally” was not sufficiently specific. The NSLS provided a proposed text change to Section 5.2 that specifically defines the control used to avoid exceeding 300MeV Maximum Electron Beam Energy. The Committee found the proposed revision to be acceptable.
- 1.3. The following motions were crafted by the Committee:
 - 1.3.1. Motion 1: The Committee recommends approval of Revision F of the DUV-FEL Safety Assessment Document, subject to the following condition:
 - 1.3.1.1. [Update Appendix VI, “Interlock Procedure” to reflect the current facility configuration, or provide a reference to the updated procedure in the text of the SAD.](#)

- 1.3.1.2. Recommendation for Approval of the Motion was made by W. Gunther.
- 1.3.1.3. Seconded by H. Kahnhauser.
- 1.3.1.4. The motion was approved by vote of seven in favor, none opposed.

1.3.2. Motion 2: The Committee finds that Revision B of the DUV-FEL ASE is appropriately based on the SAD safety analyses. We recommend that the Deputy Director for Operations submit this ASE to the DOE for approval.

- 1.3.2.1. Recommendation for Approval of the Motion was made by H. Kahnhauser.
- 1.3.2.2. Seconded by W. Glenn
- 1.3.2.3. The motion was approved by vote of seven in favor, none opposed.

2. The Meeting was adjourned at 2:50 p.m.
3. Addendum to the Minutes
 - 3.1. As required by Section 1.2.12, a review was conducted to determine the DOE Order for Natural Phenomena Hazards that BSA is required to comply with. Attachment J.9, Appendix I "DOE Directives" of the BSA contract requires BSA to comply with DOE Order 420.1A, "Facility Safety" dated 5/20/02. Section 4.4 "Natural Phenomena Hazards Mitigation" is applicable to all DOE nuclear and non-nuclear facilities including accelerators.
 - 3.2. The NSLS is requested to update Section 4.3 of the SAD to reference and comply with DOE Order 420.1A.